

Net Metering: What we're doing at Fort Collins Utilities

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Utilities Concerns

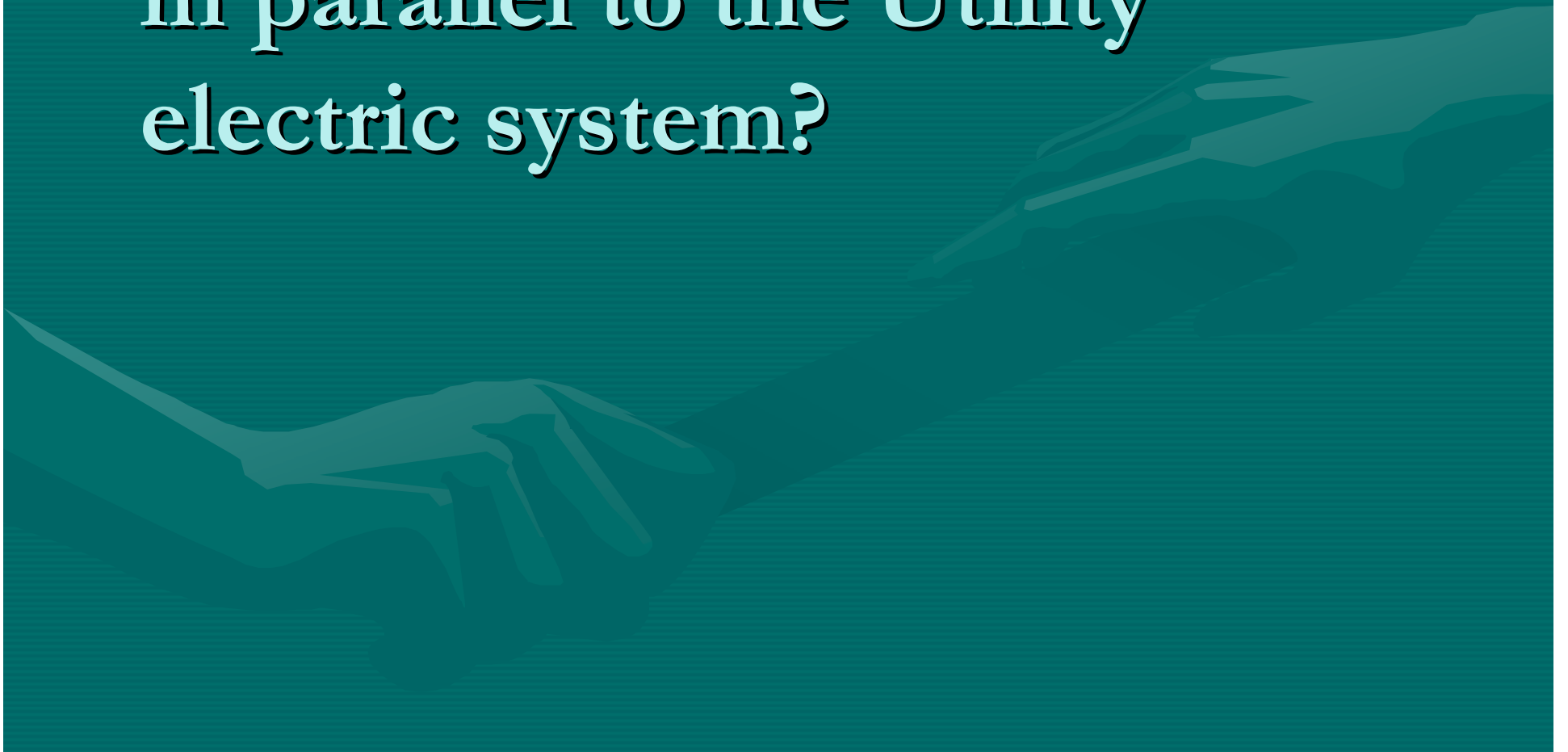
- Operational Details
- Costs and Rates
- Policy Objectives
- Respond to Customer Interest

Operational Details

It's about Safety & Reliability:

- Public / Employees
- Equipment Requirements

What does it mean to operate
customer-owned generation
in parallel to the Utility
electric system?

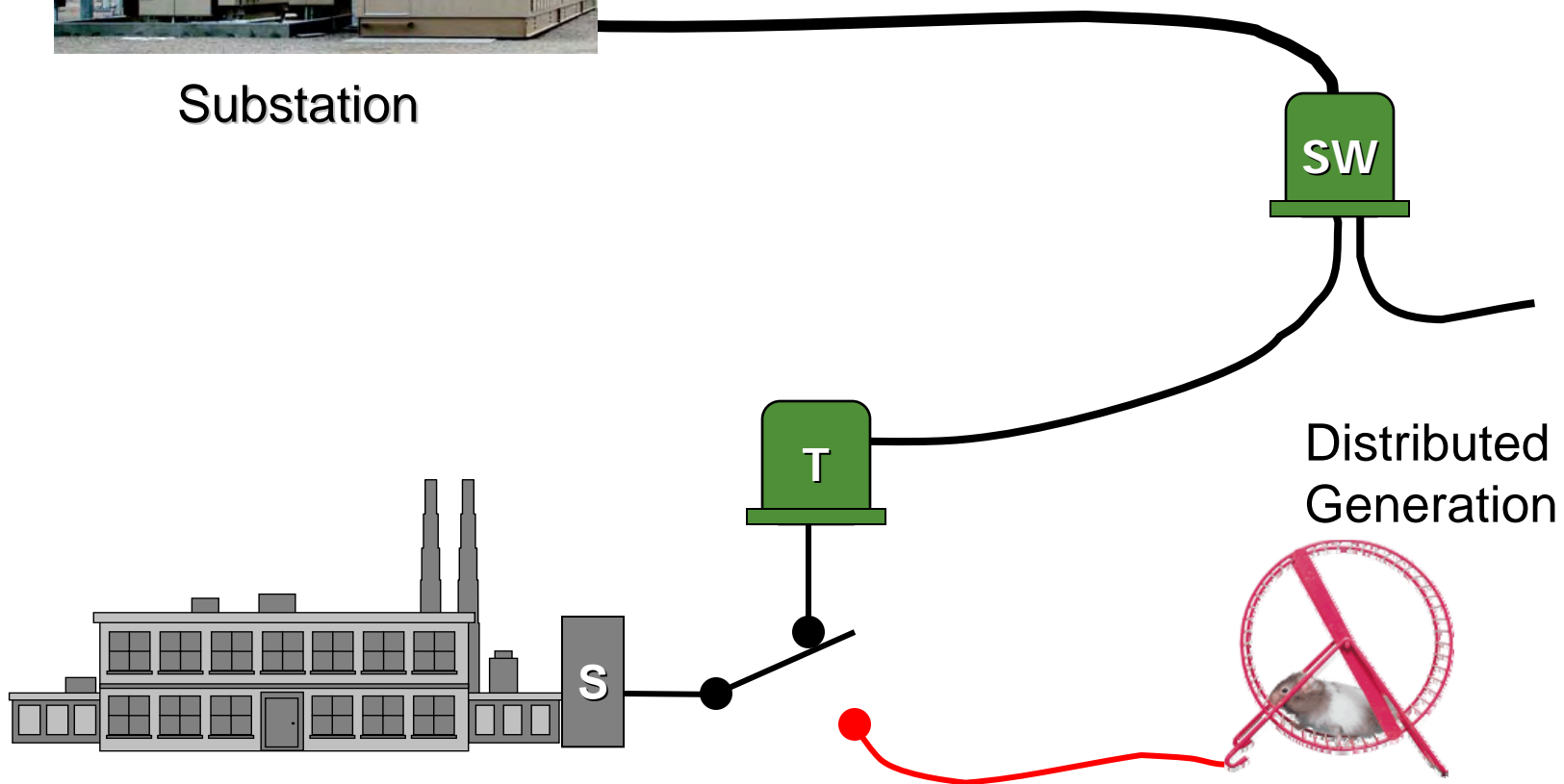


Distributed Generation (DG)

Non-Parallel (open transition)



Substation

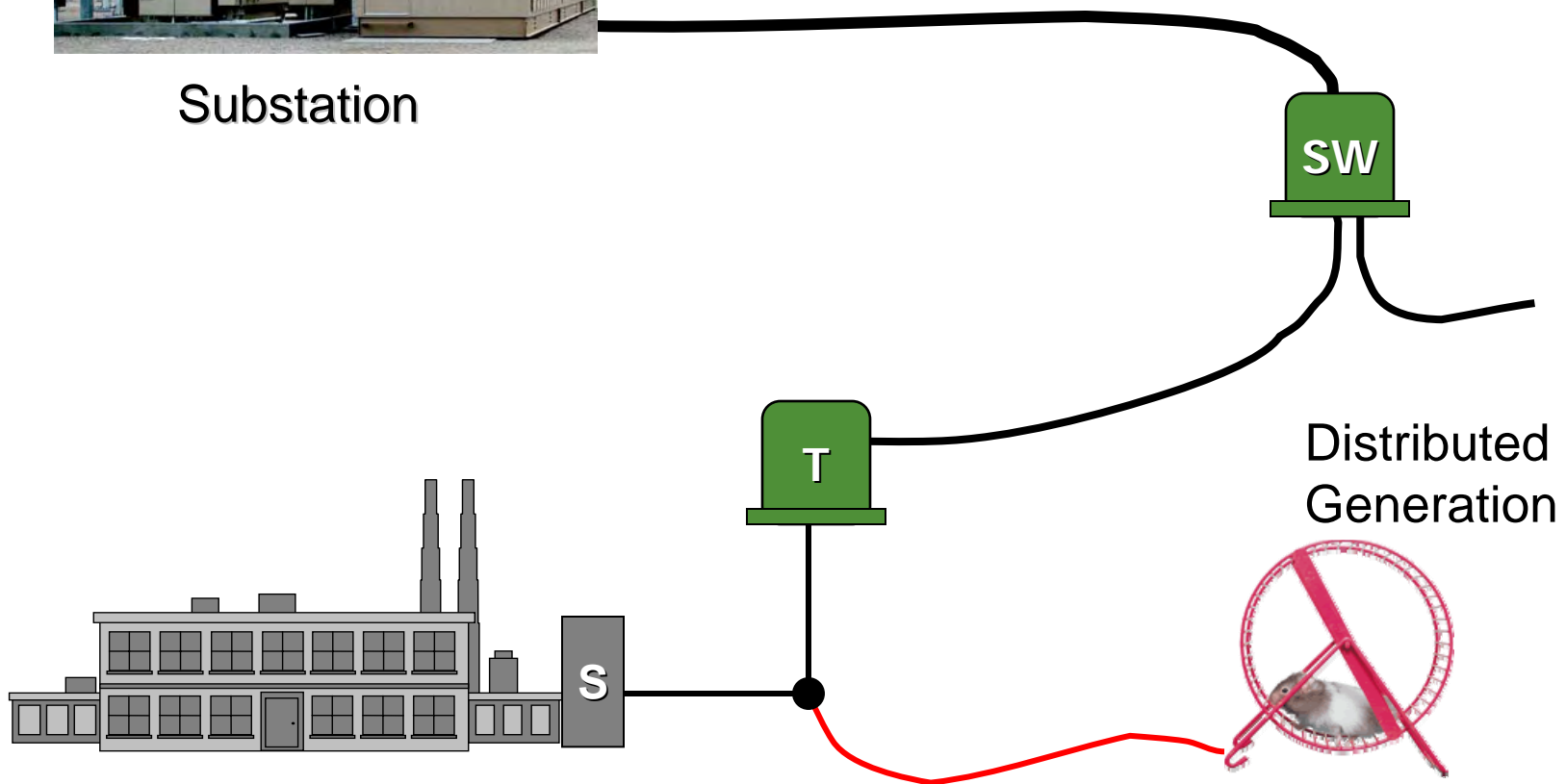


Distributed Generation (DG)

Parallel (closed transition)



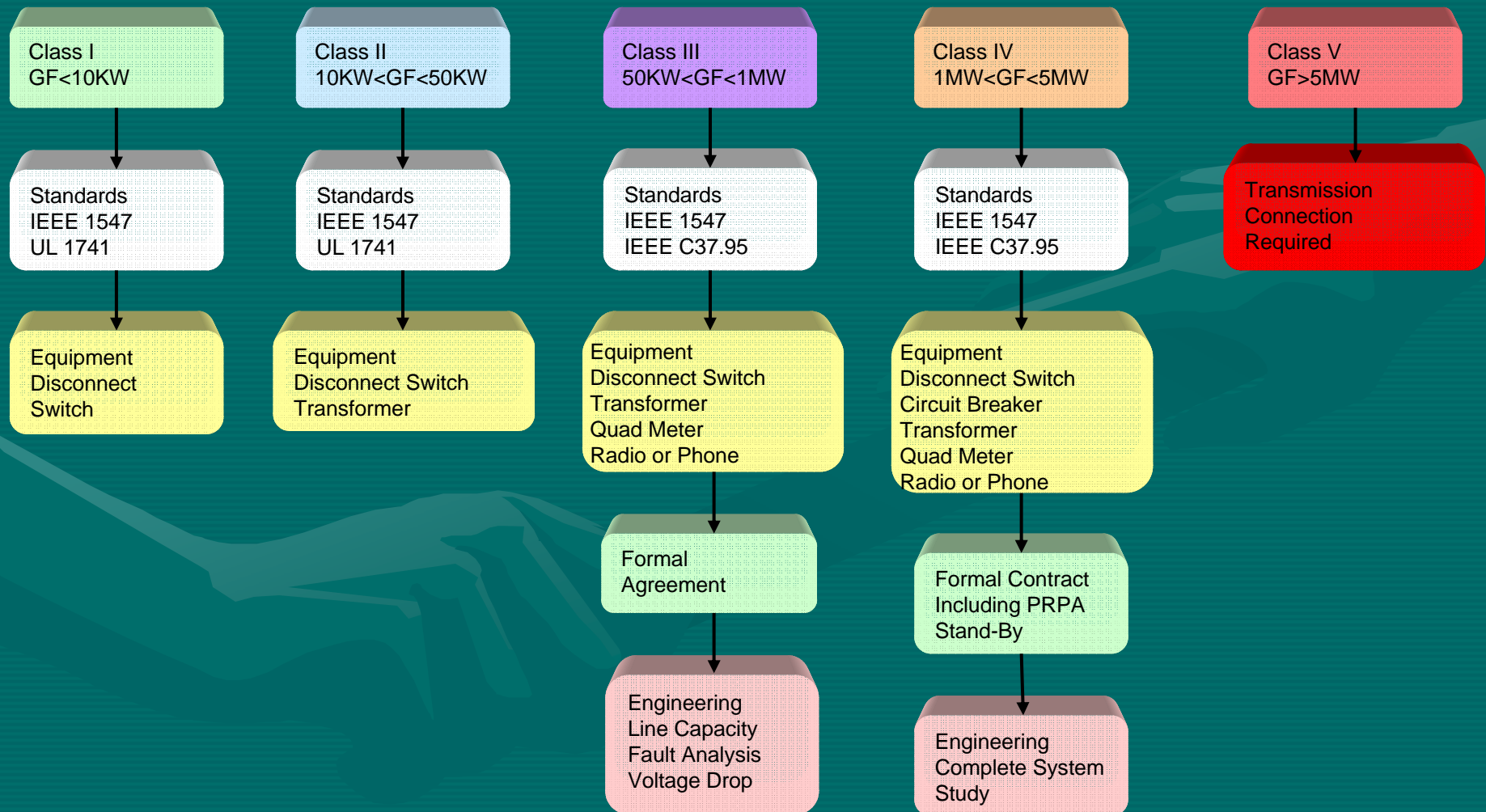
Substation



Steps in the Process:

1. Application Form (equipment)
2. Review Interconnection Requirements
(safety/reliability)
3. Interconnection agreement
4. Inspection/Testing
5. Acceptance & Permitting

Complexity of Approval Process Varies by DG Classification



Current Status

- 5 Class I Residential PV customers on pilot program
- 1 Class I Commercial PV customer (<10kW)
- 3 Class III customers (> 50kW but < 1MW)
- Approximately 1.3 MW total connected DG

The background is a solid teal color. A faint, stylized illustration of two hands shaking is visible, rendered in a lighter shade of teal. The hands are positioned diagonally across the frame, with one hand on the left and the other on the right, meeting in the center.

What is net metering?

Net Metering – A method of crediting customers for electricity that they generate on site in excess of their own electricity consumption. Depending on individual state or utility rules, the net excess generation may be credited to their account (in many cases at the retail price), carried over to a future billing period, or ignored.



Do we allow net metering?

Yes, but it may not satisfy
everyone's definition.

Approach for Large Commercial Applications

Coincident Rates

Provide opportunity to track and
pass along full savings

Rates and Costs

The reasoning behind the Coincident Rates is to put the Customer and the Utility on the same side to control and pass through prices

Coincident Rate Concepts

- A dollar paid for electricity:
 - \$0.80 passes directly to PRPA
 - Save a kWh or Coincident kW => - \$
 - Add a kWh or Coincident kW => + \$
 - \$0.06 passes directly to General Fund
 - \$0.14 kept for all FC Utilities Distribution Costs
- Administration and Fixed Charge : \$25 plus/mo

Specifics for

GS50 Rate

Fixed Charge:	\$26.50
Coincident Demand:	\$13.05/kW
Distribution Facility Demand:	\$4.57/kW
Energy:	\$0.01844/kWh

Parallel Generation Benefits

- How does that Customer generated energy tie back to costs for serving that customer?

Fixed charge

\$26.50 / mo

No savings:

Added cost for Generator metering,

+ \$26.50/mo.

Coincident Demand

\$13.05/kW

Scheduling benefit?

Currently 100% reduction

Distribution Demand

\$4.57/kW

Consistent Reduction results in
100% Savings to Customer

Distribution Demand Options

- Standby Service:
 - Customer contracts for standby KW @ \$3.62/kW
 - If exceeds contract level => penalty of \$10.86/kW and new contract level.
- Contract Option (1 MW connected load):
 - Based on Minimum Demand (Ratchet)
 - 12 month based concept

Distribution Demand Savings

Simplified Example

	Example Operational Experience			Related Billing Charges and Credits		
	Net Metered Demand KW	Parallel Generator Metered Output KW	Gross Facility Demand KW	Gross Facility Demand KW	Minimum Generator Contribution KW	Facility Demand Billing KW
Mo 1	12,149.40	750.00	12,899.40	12,899.40	0	12,899.40
Mo 2-11	Same	Same	Same	Same	0	Same
Mo 12	12,149.40	750.00	12,899.40	12,899.40	750*12	3,899.40
Mo 13	12,149.40	750.00	12,899.40	12,899.40	750.00	12,149.40
Mo 14	12,549.40	350.00	12,899.40	12,899.40	350.00	12,549.40
Mo 15	12,899.40	0.00	12,899.40	12,899.40	0.00	12,899.40
Mo 16	12,149.40	750.00	12,899.40	12,899.40	0.00	12,899.40

Energy

\$0.01844/kWh

Reduced Use: Full Retail Price

Energy to Grid: Full Wholesale Cost

Residential Parallel Distributed Generation Pilot Program

- **Number of customers:** maximum of 25 customers
- **Duration:** terms of the pilot program apply until 12/31/09
- **System size:** applications of 10 kW or smaller
- **Metering:** single meter, recording the net use of electricity, for billing purposes
- **Rates and billing:**
 - net monthly energy consumption under the "Residential Energy Service" (R) rate
 - no standby charges
 - Net excess generation (in kWh) credited on a monthly basis, credits carried over from month-to-month, Unused credits granted to Fort Collins Utilities (without compensation) at the end of each 12-month billing cycle
- **Interconnection standards:** meet standards IEEE 1547 and UL 1741, including lockable disconnect switch.
- **Monitoring:** Utilities has option to install and maintain data acquisition equipment and a load survey meter for evaluation purposes

Residential Parallel Distributed Generation Pilot Program

Address	KW
4218 Goshawk	0.9
1427 West Mountain	3.0
318 Whedbee	1.8
4225 Table Mountain	1.5
208 Fishback	2.5

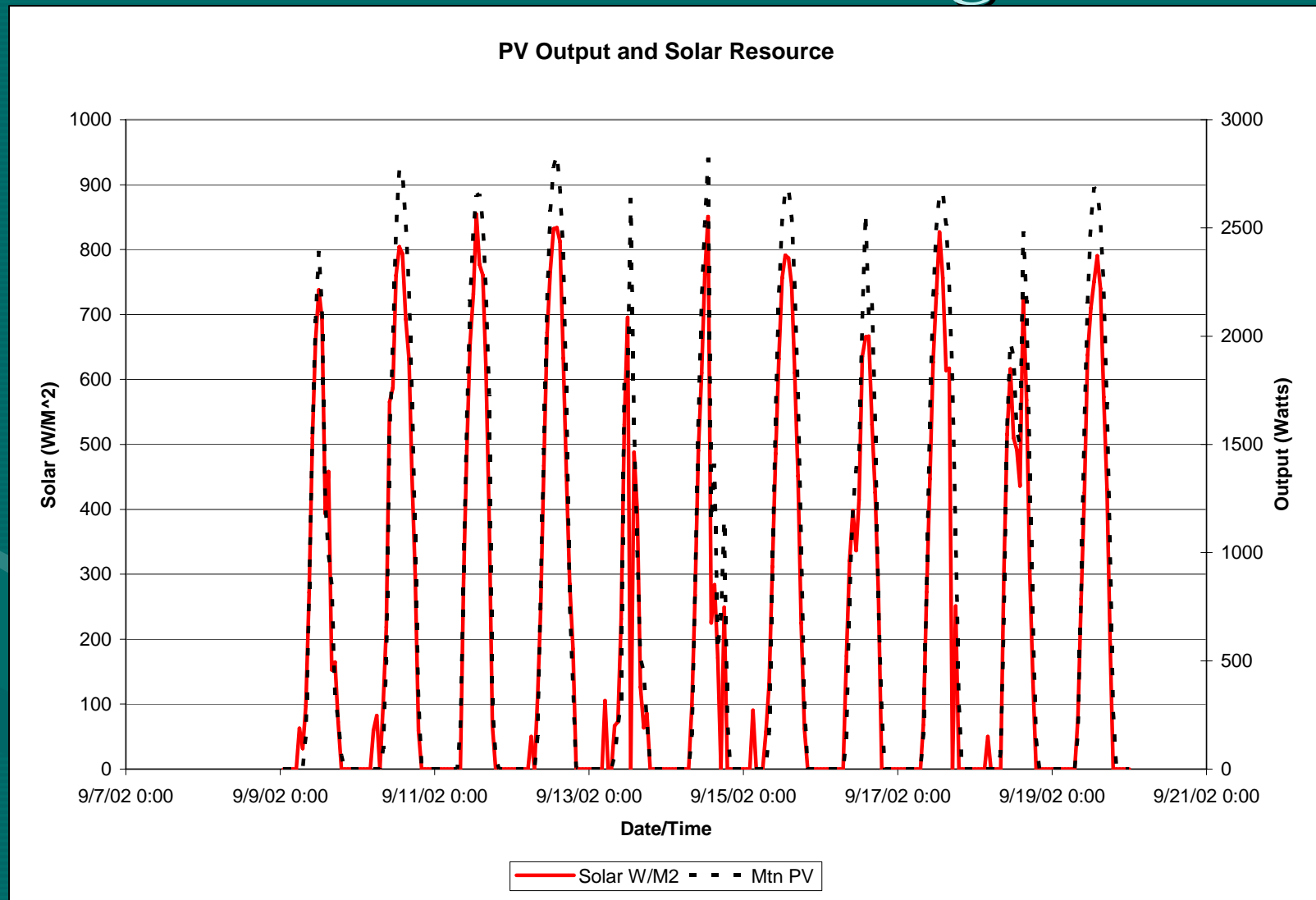
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- Load research meters on all five
- Data loggers on 318 Whedbee and 1427 Mountain

Residential Parallel Distributed Generation Pilot Program

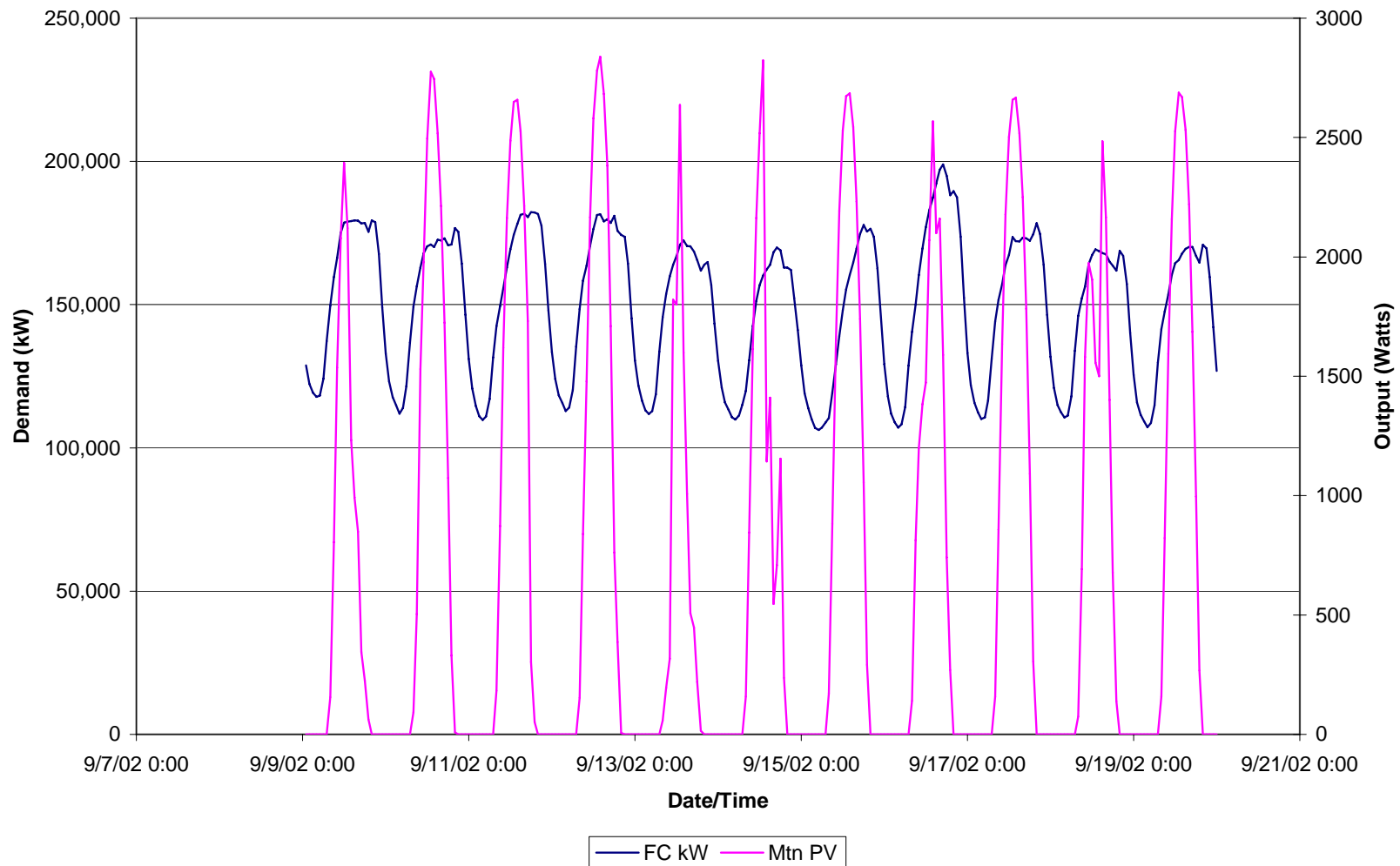
- Goals of study
 - Understand avoided purchased power benefits of distributed PV
 - Compare / calibrate model based PV output with measured performance
 - House with and w/o PV system, compare average rate with real costs
- Data parameters
 - Hourly outputs of PV systems (data logger)
 - Solar insolation (CSU weather station)
 - Ambient temperature (CSU weather station)
 - Hourly Fort Collins electric load (PRPA)
 - PV system characteristics

Residential Parallel Distributed Generation Pilot Program



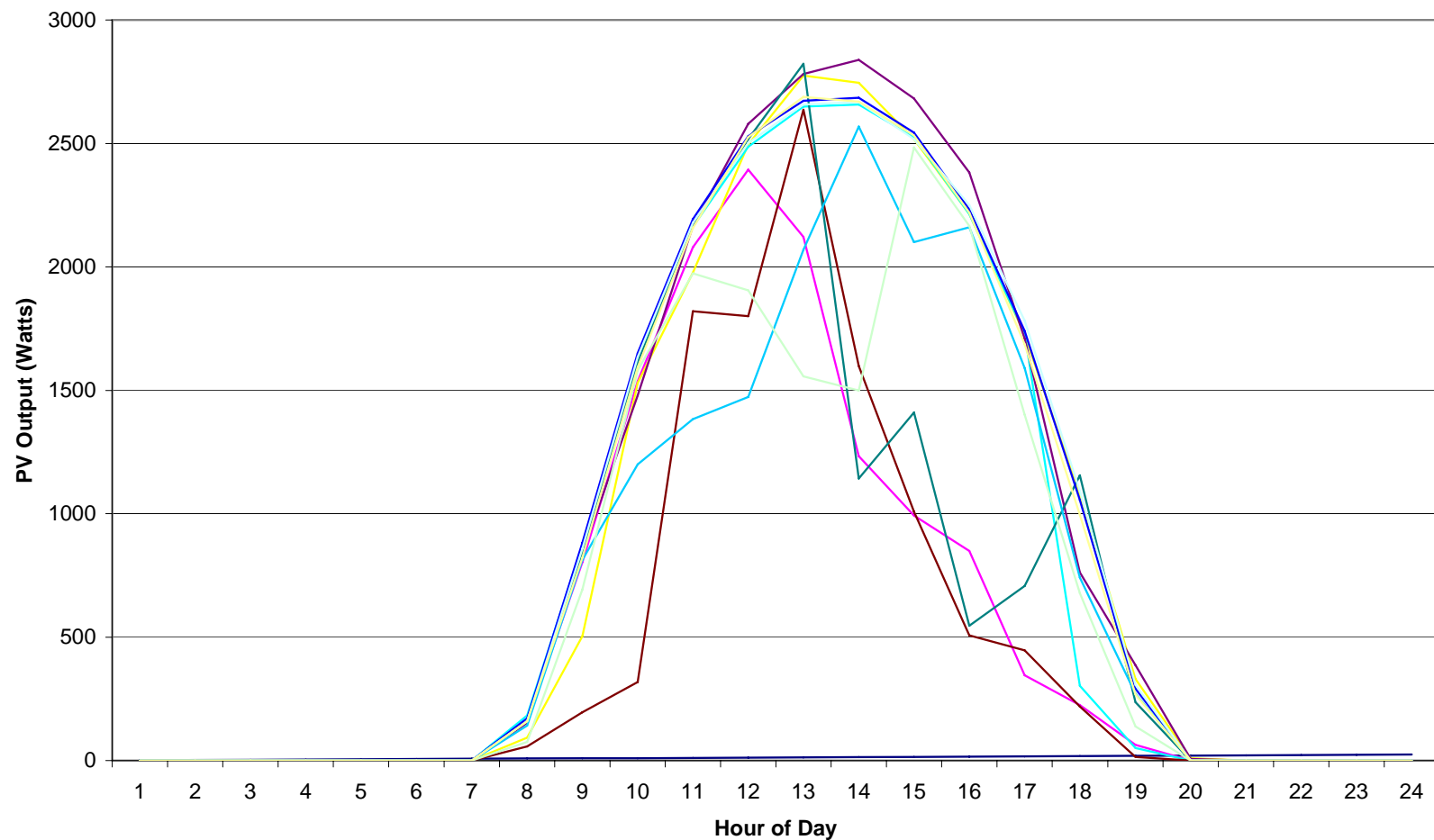
Residential Parallel Distributed Generation Pilot Program

Sample Utility and PV Output Profile




Residential Parallel Distributed Generation Pilot Program


PV Daily Profiles,
1427 Mountain Ave.



Residential Parallel Distributed Generation Pilot Program



**AC Energy
&
Cost Savings**



Station Identification		Results			
City:	Boulder	Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
State:	CO	1	4.43	373	26.11
Latitude:	40.02° N	2	4.89	365	25.55
Longitude:	105.25° W	3	6.05	493	34.51
Elevation:	1634 m	4	6.09	463	32.41
PV System Specifications		5	5.99	458	32.06
DC Rating:	3.5 kW	6	6.08	438	30.66
DC to AC Derate Factor:	0.770	7	6.06	439	30.73
AC Rating:	2.7 kW	8	6.24	453	31.71
Array Type:	Fixed Tilt	9	6.25	451	31.57
Array Tilt:	40.0°	10	5.67	440	30.80
Array Azimuth:	180.0°	11	4.60	368	25.76
Energy Specifications		12	4.29	362	25.34
Cost of Electricity:	7.0 ¢/kWh	Year	5.56	5105	357.35

Output Hourly Performance Data

Lebesch House 1427 West Mountain Ave data summary

Period 9/20/05 to 11/15/05

total watt-hours	682,796
days	55.9
kWh/day	12.2
W-hr/day/watt	3.5
max measured output (watts)	2748
system peak watts	3500

October 2005 kWh	404
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Q & A

